henry@songoku: ~/Desktop/memoryProject   ⊖ ⊡ ❌

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```
henry@songoku:~/Desktop/memoryProject$ make
g++ -c -m64 -std=c++11 -Wall -o simulation.o simulation.cpp
g++ -m64 -std=c++11 -Wall -o simulation simulation.o
henry@songoku:~/Desktop/memoryProject$ ./simulation
Enter memory size: 2000

Enter page size: (1:100, 2:200, 3:400)1
t = 0: Process 1 arrives
        Input Queue:[ 1 ]
        Process 2 arrives
        Input Queue:[ 1 2 ]
                MM moves Process 1 to memory
        Input Queue:[ 2 ]
        Memory Map: 0 - 99: Process 1, Page 1
                100 - 199: Process 1, Page 2
                200 - 299: Process 1, Page 3
                300 - 399: Process 1, Page 4
                400 - 1999: Free frame(s)

        MM moves Process 2 to memory
        Input Queue:[ ]
        Memory Map: 0 - 99: Process 1, Page 1
                100 - 199: Process 1, Page 2
                200 - 299: Process 1, Page 3
                300 - 399: Process 1, Page 4
                400 - 499: Process 2, Page 1
                500 - 599: Process 2, Page 2
                600 - 699: Process 2, Page 3
                700 - 799: Process 2, Page 4
                800 - 899: Process 2, Page 5
                900 - 999: Process 2, Page 6
                1000 - 1999: Free frame(s)

t = 100: Process 3 arrives
        Input Queue:[ 3 ]
        Process 4 arrives
        Input Queue:[ 3 4 ]
                MM moves Process 3 to memory
```

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```
t = 100: Process 3 arrives
        Input Queue:[ 3 ]
        Process 4 arrives
        Input Queue:[ 3 4 ]
                MM moves Process 3 to memory
        Input Queue:[ 4 ]
        Memory Map: 0 - 99: Process 1, Page 1
                100 - 199: Process 1, Page 2
                200 - 299: Process 1, Page 3
                300 - 399: Process 1, Page 4
                400 - 499: Process 2, Page 1
                500 - 599: Process 2, Page 2
                600 - 699: Process 2, Page 3
                700 - 799: Process 2, Page 4
                800 - 899: Process 2, Page 5
                900 - 999: Process 2, Page 6
                1000 - 1099: Process 3, Page 1
                1100 - 1199: Process 3, Page 2
                1200 - 1299: Process 3, Page 3
                1300 - 1999: Free frame(s)

        MM moves Process 4 to memory
        Input Queue:[ ]
        Memory Map: 0 - 99: Process 1, Page 1
                100 - 199: Process 1, Page 2
                200 - 299: Process 1, Page 3
                300 - 399: Process 1, Page 4
                400 - 499: Process 2, Page 1
                500 - 599: Process 2, Page 2
                600 - 699: Process 2, Page 3
                700 - 799: Process 2, Page 4
                800 - 899: Process 2, Page 5
                900 - 999: Process 2, Page 6
                1000 - 1099: Process 3, Page 1
                1100 - 1199: Process 3, Page 2
                1200 - 1299: Process 3, Page 3
                1300 - 1399: Process 4, Page 1
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                1200 - 1299: Process 3, Page 3
                1300 - 1399: Process 4, Page 1
                1400 - 1499: Process 4, Page 2
                1500 - 1999: Free frame(s)

t = 200: Process 5 arrives
        Input Queue:[ 5 ]
                MM moves Process 5 to memory
        Input Queue:[ ]
        Memory Map: 0 - 99: Process 1, Page 1
                100 - 199: Process 1, Page 2
                200 - 299: Process 1, Page 3
                300 - 399: Process 1, Page 4
                400 - 499: Process 2, Page 1
                500 - 599: Process 2, Page 2
                600 - 699: Process 2, Page 3
                700 - 799: Process 2, Page 4
                800 - 899: Process 2, Page 5
                900 - 999: Process 2, Page 6
                1000 - 1099: Process 3, Page 1
                1100 - 1199: Process 3, Page 2
                1200 - 1299: Process 3, Page 3
                1300 - 1399: Process 4, Page 1
                1400 - 1499: Process 4, Page 2
                1500 - 1599: Process 5, Page 1
                1600 - 1699: Process 5, Page 2
                1700 - 1799: Process 5, Page 3
                1800 - 1899: Process 5, Page 4
                1900 - 1999: Process 5, Page 5

t = 1000: Process 1 completes
        Memory Map: 0 - 399: Free frame(s)
                400 - 499: Process 2, Page 1
                500 - 599: Process 2, Page 2
                600 - 699: Process 2, Page 3
                700 - 799: Process 2, Page 4
                800 - 899: Process 2, Page 5
                900 - 999: Process 2, Page 6
```

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                400 - 499: Process 2, Page 1
                500 - 599: Process 2, Page 2
                600 - 699: Process 2, Page 3
                700 - 799: Process 2, Page 4
                800 - 899: Process 2, Page 5
                900 - 999: Process 2, Page 6
                1000 - 1099: Process 3, Page 1
                1100 - 1199: Process 3, Page 2
                1200 - 1299: Process 3, Page 3
                1300 - 1399: Process 4, Page 1
                1400 - 1499: Process 4, Page 2
                1500 - 1599: Process 5, Page 1
                1600 - 1699: Process 5, Page 2
                1700 - 1799: Process 5, Page 3
                1800 - 1899: Process 5, Page 4
                1900 - 1999: Process 5, Page 5

Process 3 completes
        Memory Map: 0 - 399: Free frame(s)
                400 - 499: Process 2, Page 1
                500 - 599: Process 2, Page 2
                600 - 699: Process 2, Page 3
                700 - 799: Process 2, Page 4
                800 - 899: Process 2, Page 5
                900 - 999: Process 2, Page 6
                1000 - 1299: Free frame(s)
                1300 - 1399: Process 4, Page 1
                1400 - 1499: Process 4, Page 2
                1500 - 1599: Process 5, Page 1
                1600 - 1699: Process 5, Page 2
                1700 - 1799: Process 5, Page 3
                1800 - 1899: Process 5, Page 4
                1900 - 1999: Process 5, Page 5

Process 5 completes
        Memory Map: 0 - 399: Free frame(s)
                400 - 499: Process 2, Page 1
                500 - 599: Process 2, Page 2
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                1900 - 1999: Process 5, Page 5

Process 5 completes
        Memory Map: 0 - 399: Free frame(s)
                400 - 499: Process 2, Page 1
                500 - 599: Process 2, Page 2
                600 - 699: Process 2, Page 3
                700 - 799: Process 2, Page 4
                800 - 899: Process 2, Page 5
                900 - 999: Process 2, Page 6
                1000 - 1299: Free frame(s)
                1300 - 1399: Process 4, Page 1
                1400 - 1499: Process 4, Page 2
                1500 - 1999: Free frame(s)

t = 1200: Process 6 arrives
        Input Queue:[ 6 ]
                MM moves Process 6 to memory
        Input Queue:[ ]
        Memory Map: 0 - 99: Process 6, Page 1
                100 - 199: Process 6, Page 2
                200 - 299: Process 6, Page 3
                300 - 399: Free frame(s)
                400 - 499: Process 2, Page 1
                500 - 599: Process 2, Page 2
                600 - 699: Process 2, Page 3
                700 - 799: Process 2, Page 4
                800 - 899: Process 2, Page 5
                900 - 999: Process 2, Page 6
                1000 - 1299: Free frame(s)
                1300 - 1399: Process 4, Page 1
                1400 - 1499: Process 4, Page 2
                1500 - 1999: Free frame(s)

t = 1500: Process 7 arrives
        Input Queue:[ 7 ]
                MM moves Process 7 to memory
        Input Queue:[ ]
```

```
                1500 - 1999: Free frame(s)

t = 1500: Process 7 arrives
        Input Queue:[ 7 ]
                MM moves Process 7 to memory
        Input Queue:[ ]
        Memory Map: 0 - 99: Process 6, Page 1
                100 - 199: Process 6, Page 2
                200 - 299: Process 6, Page 3
                300 - 399: Process 7, Page 1
                400 - 499: Process 2, Page 1
                500 - 599: Process 2, Page 2
                600 - 699: Process 2, Page 3
                700 - 799: Process 2, Page 4
                800 - 899: Process 2, Page 5
                900 - 999: Process 2, Page 6
                1000 - 1099: Process 7, Page 2
                1100 - 1199: Process 7, Page 3
                1200 - 1299: Process 7, Page 4
                1300 - 1399: Process 4, Page 1
                1400 - 1499: Process 4, Page 2
                1500 - 1599: Process 7, Page 5
                1600 - 1699: Process 7, Page 6
                1700 - 1799: Process 7, Page 7
                1800 - 1899: Process 7, Page 8
                1900 - 1999: Free frame(s)

t = 1600: Process 8 arrives
        Input Queue:[ 8 ]
                MM moves Process 8 to memory
        Input Queue:[ ]
        Memory Map: 0 - 99: Process 6, Page 1
                100 - 199: Process 6, Page 2
                200 - 299: Process 6, Page 3
                300 - 399: Process 7, Page 1
                400 - 499: Process 2, Page 1
                500 - 599: Process 2, Page 2
                600 - 699: Process 2, Page 3
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                1800 - 1899: Process 7, Page 8
                1900 - 1999: Free frame(s)

t = 1600: Process 8 arrives
        Input Queue:[ 8 ]
                MM moves Process 8 to memory
        Input Queue:[ ]
        Memory Map: 0 - 99: Process 6, Page 1
                100 - 199: Process 6, Page 2
                200 - 299: Process 6, Page 3
                300 - 399: Process 7, Page 1
                400 - 499: Process 2, Page 1
                500 - 599: Process 2, Page 2
                600 - 699: Process 2, Page 3
                700 - 799: Process 2, Page 4
                800 - 899: Process 2, Page 5
                900 - 999: Process 2, Page 6
                1000 - 1099: Process 7, Page 2
                1100 - 1199: Process 7, Page 3
                1200 - 1299: Process 7, Page 4
                1300 - 1399: Process 4, Page 1
                1400 - 1499: Process 4, Page 2
                1500 - 1599: Process 7, Page 5
                1600 - 1699: Process 7, Page 6
                1700 - 1799: Process 7, Page 7
                1800 - 1899: Process 7, Page 8
                1900 - 1999: Process 8, Page 1

t = 2000: Process 2 completes
        Memory Map: 0 - 99: Process 6, Page 1
                100 - 199: Process 6, Page 2
                200 - 299: Process 6, Page 3
                300 - 399: Process 7, Page 1
                400 - 999: Free frame(s)
                1000 - 1099: Process 7, Page 2
                1100 - 1199: Process 7, Page 3
                1200 - 1299: Process 7, Page 4
                1300 - 1399: Process 4, Page 1
```

```
t = 2000: Process 2 completes
        Memory Map: 0 - 99: Process 6, Page 1
                100 - 199: Process 6, Page 2
                200 - 299: Process 6, Page 3
                300 - 399: Process 7, Page 1
                400 - 999: Free frame(s)
                1000 - 1099: Process 7, Page 2
                1100 - 1199: Process 7, Page 3
                1200 - 1299: Process 7, Page 4
                1300 - 1399: Process 4, Page 1
                1400 - 1499: Process 4, Page 2
                1500 - 1599: Process 7, Page 5
                1600 - 1699: Process 7, Page 6
                1700 - 1799: Process 7, Page 7
                1800 - 1899: Process 7, Page 8
                1900 - 1999: Process 8, Page 1

Process 4 completes
        Memory Map: 0 - 99: Process 6, Page 1
                100 - 199: Process 6, Page 2
                200 - 299: Process 6, Page 3
                300 - 399: Process 7, Page 1
                400 - 999: Free frame(s)
                1000 - 1099: Process 7, Page 2
                1100 - 1199: Process 7, Page 3
                1200 - 1299: Process 7, Page 4
                1300 - 1499: Free frame(s)
                1500 - 1599: Process 7, Page 5
                1600 - 1699: Process 7, Page 6
                1700 - 1799: Process 7, Page 7
                1800 - 1899: Process 7, Page 8
                1900 - 1999: Process 8, Page 1

Process 7 completes
        Memory Map: 0 - 99: Process 6, Page 1
                100 - 199: Process 6, Page 2
                200 - 299: Process 6, Page 3
                300 - 1899: Free frame(s)
```

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                1700 - 1799: Process 7, Page 7
                1800 - 1899: Process 7, Page 8
                1900 - 1999: Process 8, Page 1

Process 4 completes
        Memory Map: 0 - 99: Process 6, Page 1
                100 - 199: Process 6, Page 2
                200 - 299: Process 6, Page 3
                300 - 399: Process 7, Page 1
                400 - 999: Free frame(s)
                1000 - 1099: Process 7, Page 2
                1100 - 1199: Process 7, Page 3
                1200 - 1299: Process 7, Page 4
                1300 - 1499: Free frame(s)
                1500 - 1599: Process 7, Page 5
                1600 - 1699: Process 7, Page 6
                1700 - 1799: Process 7, Page 7
                1800 - 1899: Process 7, Page 8
                1900 - 1999: Process 8, Page 1

Process 7 completes
        Memory Map: 0 - 99: Process 6, Page 1
                100 - 199: Process 6, Page 2
                200 - 299: Process 6, Page 3
                300 - 1899: Free frame(s)
                1900 - 1999: Process 8, Page 1

t = 2100: Process 8 completes
        Memory Map: 0 - 99: Process 6, Page 1
                100 - 199: Process 6, Page 2
                200 - 299: Process 6, Page 3
                300 - 1999: Free frame(s)

t = 3000: Process 6 completes
        Memory Map: 0 - 1999: Free frame(s)

Average Turnaround Time: 1175
henry@songoku:~/Desktop/memoryProject$
```